

CLAIMS

What is claimed is:

1. An aircraft fuel system comprising:

a main fuel pump for pumping fuel to a fuel metering device; and

a fuel de-aerator for removing dissolved gases from the fuel before entering said main fuel pump.
2. The system of claim 1, wherein removal of said dissolved gases within said fuel reduces a net positive suction pressure required at an inlet of said main fuel pump.
3. The system of claim 1, comprising a boost pump for supplying the main fuel pump with fuel at a desired pressure.
4. The system of claim 3, wherein said boost pump supplies a net positive suction pressure at an inlet of said main fuel pump.
5. The system of claim 3, wherein said fuel de-aerator is disposed between said boost pump and said main fuel pump.
6. The system of claim 1, wherein said fuel de-aerator comprises a membrane filter permeable to gases dissolved within said fuel.

7. The system of claim 6, wherein said membrane filter is supported on a porous substrate.
8. The system of claim 7, comprising a partial pressure differential between a fuel side of said membrane filter and a non-fuel side of said membrane filter, wherein gases diffuse from fuel through said membrane filter to said non-fuel side.
9. The system of claim 8, wherein said diffused gases on said non-fuel side are vented overboard.
10. The system of claim 7, further comprising a fuel plate defining fuel passages within a housing between an inlet and an outlet
11. The system of claim 1, wherein said fuel de-aerator comprises a tubular membrane.
12. The system of claim 1, wherein a rate of fuel flow capacity of said system is related to said net positive suction pressure.
13. The system of claim 12, wherein said rate of fuel flow capacity increases responsive to removal of gases from said fuel.

14. A gas turbine engine assembly comprising:
- a compressor to compress intake air;
 - a combustor to combust fuel with compressed intake air;
 - a turbine section comprising a rotating turbine in flow communication with said combustor; and
 - a fuel delivery system comprising a main fuel pump for pumping fuel to a fuel metering device, and a fuel de-aerator for removing dissolved gases from the fuel before entering said main fuel pump.
15. The assembly of claim 14, comprising a boost pump for supplying the main fuel pump with fuel at a said net positive suction pressure.
16. The assembly of claim 15, wherein said fuel de-aerator is disposed between said boost pump and said main fuel pump.
17. The assembly of claim 14, wherein said fuel de-aerator comprises a membrane filter permeable to gases dissolved within said fuel.
18. The assembly of claim 17, comprising a partial pressure differential between a fuel side of said membrane filter and a non-fuel side of said membrane filter, wherein gases diffuse from said fuel side through said membrane filter to said non-fuel side.

19. A method of improving fuel system operational capacity comprising the steps of:

- a) flowing fuel containing dissolved gases through a de-aerator;
- b) removing dissolved gases from fuel within the de-aerator; and
- c) flowing fuel to an inlet of a main fuel pump at a required net positive

suction pressure.

20. The method of claim 19, further comprising flowing fuel along a fuel side of a permeable membrane within the de-aerator.

21. The method of claim 20, comprising providing a partial pressure differential between the fuel side of the permeable membrane and a non-fuel side to diffuse dissolved gases from the fuel through the permeable membrane.

22. The method of claim 21, comprising pumping fuel into the de-aerator with a boost pump to provide the required net positive suction pressure to the inlet of the main pump.